



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/661,035	09/13/2000	Tomohide Terashima	49657-801	8222

7590 09/24/2003

McDermott Will & Emery
600 13th Street NW
Washington, DC 20005-3096

EXAMINER

LOKE, STEVEN HO YIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/661,035

Applicant(s)

TERASHIMA, TOMOHIDE

Examiner

Steven Loke

Art Unit

2811

H

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-9 and 13 is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-12 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

1. Claims 1-6, 12 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Fig. 14 discloses a position of an interface between the p-type region [7] and the n-type region [2] in a depth direction is constant along a direction of flow of the current from the n-type regions [6a-6d] to the n-type region [4]. Therefore, the specification never discloses a position of an interface between the first region and the fourth region in a depth direction changes for any cross sections crossing a region in which the interface exists along a direction of flow of the current as claimed in claim 1.

Figs. 14 and 15 disclose the position of the interface in the depth direction changes for a cross section crossing the region along a direction substantially orthogonal to the direction of the current flow. However, the specification never discloses the position of the interface between the first region and the fourth region in the depth direction changes for any cross sections crossing the region along a direction substantially orthogonal to the direction of the current flow as claimed in claim 1.

The specification (page 23, line 33 to page 24, line 4) discloses the ninth embodiment may employ a P-type diffusion region, which is continuously formed in the direction crossing the direction of the current flow, and has a variable depth. However, the specification never discloses a position of an interface between the first region and

the fourth region in a depth direction changes for any cross sections crossing a region in which the interface exists along a direction of flow of the current as claimed in claim 2.

The specification also never discloses the position of the interface between the first region and the fourth region in the depth direction changes for any cross sections crossing the region along a direction substantially orthogonal to the direction of the current flow as claimed in claim 2.

The specification never discloses the device of claim 1 also comprises a plurality of fourth regions spaced from each other by a distance allowing connection between depletion layers extending from the neighboring fourth regions, respectively, in an on state as claimed in claim 5.

2. Claims 10 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 discloses a single fourth region of the first conductivity type having a depth changing as a position moves in a direction crossing of flow of the current. However, it is unclear how a plurality of discretely formed regions are able to have a depth changing as a position moves in a direction crossing a direction of flow of the current as claimed in claim 10.

3. Applicant's arguments filed 9/2/03 have been fully considered but they are not persuasive.

It is urged, in page 10 of the remarks, that the Examiner has improperly limited the scope of independent claims 1 and 7 to a single fourth region. It also urged that the

Art Unit: 2811

additional fourth regions are included within the scope of the claims. However, it is important to note that the limitations of claims 1 and 7 are directed to a continuous p-type region having a structure similar to region [7] in the second embodiment (figs. 14 and 15 and page 23, line 33 to page 24, line 4). The plurality of fourth regions as disclosed in claims 5 and 10 would be directed to a structure similar to regions [7] in the first and sixth embodiments (figs. 1, 3 and 26). Since the specification never discloses the second embodiment can be combined with either the first or the sixth embodiment, it becomes vague and indefinite for claim 10 also includes the limitation of claim 7. The specification also never discloses the subject matters as claimed in claim 5.

It is also urged, in page 10 of the remarks, that applicant clearly explained how a position of an interface between the first region and the fourth region in a depth direction changes for any cross sections crossing a region in which the interface exists along a direction of flow of the current and substantially orthogonal to the direction of the current flow for a fourth region comprising a plurality of discretely formed neighboring regions. However, the specification still does not disclose an embodiment having both region [7] as disclosed in fig. 15 and the regions [7] as disclosed in fig. 3.

4. Claims 7-9 and 13 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

Art Unit: 2811

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
September 20, 2003

Steven Loke
Primary Examiner

A handwritten signature in cursive script that reads "Steven Loke".